

Serial No.: 10/720,173
Docket No.: 102-1003
Response After Final dated February 24, 2009
Reply to the Final Office Action of December 24, 2008

REMARKS

Introduction

Applicant notes with appreciation the Examiner's indication that claim 6 is allowed. Upon entry of the foregoing response, claims 1-6 and 8-31 are pending in the application. No claims have been amended. No new matter is being presented.

In view of the following remarks, entry of the foregoing response after final rejection, and reconsideration and allowance of all the pending claims are respectfully requested.

Rejection under 35 USC §103

Claims 1-5 and 8-31 have been rejected under 35 U.S.C. §103(a) as being unpatentable over Applicant's Admitted Prior Art in view of U.S. Patent No. 7,006,068 to Haga. Applicant respectfully traverses the rejection for at least the following reasons.

Independent Claim 1

In the Office Action mailed on December 24, 2008, the Examiner contends that AAPA discloses most of the features of Applicant's claims, except the Examiner acknowledges on pages 20-22 of the Office Action that "the Applicant is correct that Haga does not explicitly disclose a first inverter to invert the signal output from the level converter and a second inverter including at least two time extending elements to extend the inverted signal output from the first inverter by a transient time of the output potential level of the signal input from the level converter to the switching unit during which the potential level of the signal input from the level converter to the switching unit is converted from a first signal level to a second signal level and vice versa."

However, the Examiner then contends that stage 1 and stage 2 of the two-stage CMOS of Haga collectively serves as a transient time extending part, and that the main difference between Haga's two-stage CMOS inverter system and the transient time extending part 243 of

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Applicant's invention is that "the stages in the applicant's invention are reversed; the applicant lists the single inverter (stage 2 of Haga) first and then the second inverter 243 (stage 1 of Haga)." Thus, the Examiner contends that "both arrangements appear to perform the same function, which is to extend transient time," i.e., that the "collective whole appears to perform the same function of extending transient time, regardless of the order of the individual inverters." See, Office Action, page 22. The Examiner then concludes that "it would have been obvious to one of ordinary skill in the art to design a transient time-extending two-stage inverter system with either a first inverter followed by a second inverter including at least two time extending elements, or a second inverter followed by the first inverter; such an arrangement would be an obvious design choice."

Applicant respectfully disagrees with the Examiner's allegations, and submits that Haga's two-stage CMOS inverter system does not perform the same function as Applicant's transient time extending part, for at least the following reasons.

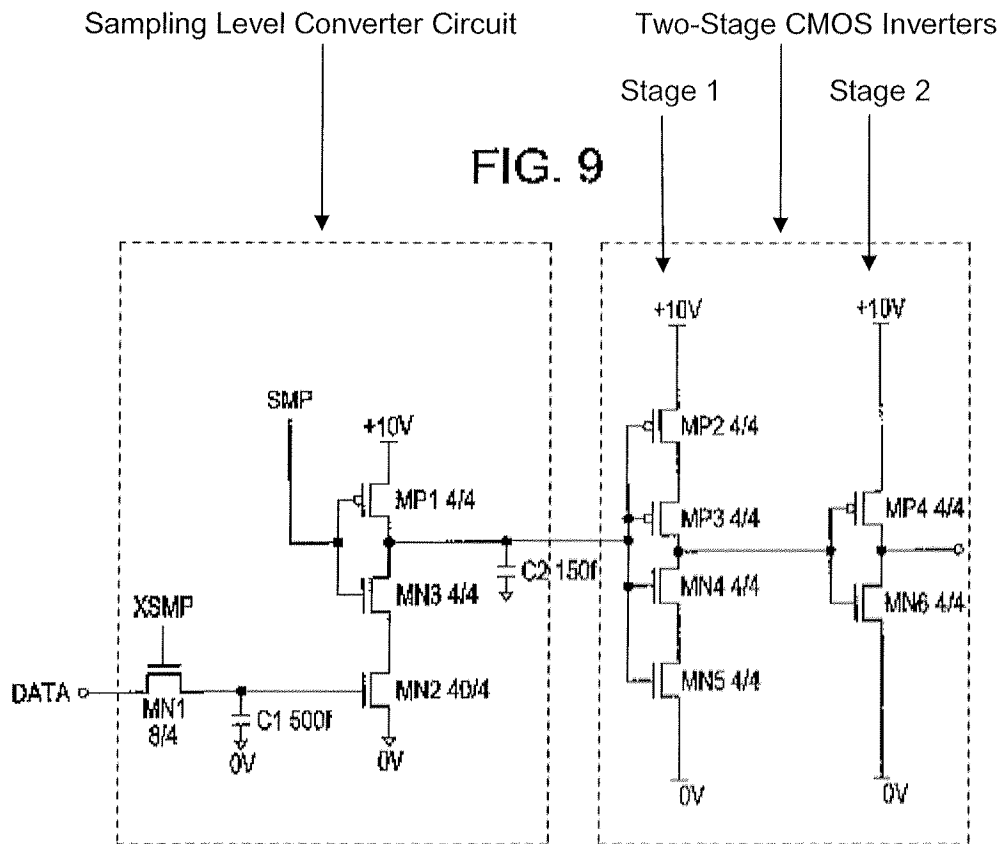
Referring to paragraphs [0071-0072] of Applicant's specification, for example, Applicant's transient time extending part 243 extends the transient time taken to convert a signal level into a different signal level. Here, the transient time is the time period during which the potential level of the signal (first nozzle selection signal) inputted from the level converter 241 to the switching unit 250 is converted from a first signal level to a second signal level and vice versa," e.g., from a logic "high" signal to a logic "low" signal and vice versa.

In contrast, Haga's two-stage CMOS inverter system (see edited Fig. 9 of Haga below) does not "extend the inverted signal output from the first inverter by a transient time of the output potential level of the signal input from the level converter to the switching unit during which the potential level of the signal input from the lever converter to the switching unit is converted fro a first signal level to a second signal level and vice versa," as recited in independent claim 1.

Instead, Haga's Stage 1 inverter merely receives an output directly from the sampling level converter circuit (C2), and does not extend the time in which a first signal level (e.g. logic "high" signal) is converted to a second signal level (e.g., logic "low signal) and vice versa. Accordingly, Haga's two-stage CMOS inverter system functions in an entirely different way than

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Applicant's transient time extending part, since the output of the sampling level converter circuit of Haga is not inverted before being input to the Stage 1 inverter.



In other words, the Stage 1 inverter of Haga is merely connected to an output of the sampling level converter circuit of Haga, and receives a terminal voltage of capacitor C2. In this configuration, Haga merely reduces a short-circuit current (from a high potential power supply to a low potential power supply) of the Stage 1 inverter," to lengthen the transient time required to discharge the precharged capacitor C2 with respect to an ordinary logic signal. See column 18, lines 39-50 of Haga.

Thus, it is respectfully submitted that Haga's two-stage CMOS inverter system does not

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perform the same function as Applicant's "transient time extending part," as recited in independent claim 1, for at least the reason that "lengthening the transient time to discharge a capacitor" is distinctly different than "extend[ing] the inverted signal output from the first inverter by a transient time of the output potential level of the signal input from the level converter to the switching unit during which the potential level of the signal input from the level converter to the switching unit is converted from a first signal level to a second signal level and vice versa."

Therefore, with reference to column 18, lines 44-48 of Haga, it is clear that Haga merely increases a time required to discharge an electrical charge that has been accumulated in pre-charged capacitor C2, and does not extend an inverted signal output from a first inverter by a transient time of an output potential level of a signal input from Haga's sampling level converter circuit. Accordingly, it is respectfully submitted that Haga does not remedy the deficiencies of AAPA regarding "a transient time extending part" as presently recited in independent claim 1.

It is well-settled that "[t]o establish a *prima facie* case of obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art. *In re Royka*, 490 F.2d 981, 180 USPQ 580 (CCPA 1974). "All words in a claim must be considered in judging the patentability of that claim against the prior art." *In re Wilson*, 424 F.2d 1382, 1385, 165 USPQ 494, 496 (CCPA 1970).

Thus, for at least the reason that the Examiner has not shown that AAPA and Haga, separately or in combination, teach or suggest, among other things, "a transient time extending part comprising a first inverter to invert the signal output from the level converter, and a second inverter including at least two time extending elements to extend the inverted signal output from the first inverter by a transient time of the output potential level of the signal input from the level converter to the switching unit during which the potential level of the signal input from the level converter to the switching unit is converted from a first signal level to a second signal level and vice versa," the Examiner has not provided a sufficient factual basis to support a *prima facie* case of obviousness with respect to claim 1. Accordingly, these documents cannot be properly used to reject claim 1 under 35 U.S.C. §103(a) as submitted in the Office Action mailed on December 24, 2008, and withdrawal of the rejection and allowance of claim 1 are respectfully requested.

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Furthermore, in the Examiner's "Response to Arguments" section on page 23 of the Office Action, the Examiner notes that Haga is not the primary reference," and that "Haga is used to teach a specific limitation missing from A.A.P.A." However, it is respectfully submitted that even if it would be possible to combine AAPA and Haga as suggested by the Examiner, the hypothetical combination would still fail to teach or suggest, among other things, "a transient time extending part comprising a first inverter to invert the signal output from the level converter, and a second inverter including at least two time extending elements to extend the inverted signal output from the first inverter by a transient time of the output potential level of the signal input from the level converter to the switching unit during which the potential level of the signal input from the level converter to the switching unit is converted from a first signal level to a second signal level and vice versa," as recited in independent claim 1. In contrast, as pointed out above, Haga's two-stage CMOS inverter system is not "a transient time extending part," as recited in claim 1, for at least the reason that Haga's two-stage CMOS inverter merely increases a time required to discharge an electrical charge that has been accumulated in pre-charged capacitor C2. Thus, even if AAPA and Haga are combined in the manner suggested by the Examiner, the hypothetical combination would still fail to teach or suggest all of the features of the invention as recited in independent claim 1.

Moreover, as pointed out in Applicant's previous Remarks filed on September 19, 2008, there would be no motivation to modify Haga and AAPA to arrive at Applicant's transient time extending part, for at least the reason that doing so would destroy the purpose and functionality of Haga. Although the Examiner notes that Haga is not the primary reference and that AAPA is not being incorporated into Haga, it is well-settled that "[r]eferences are not properly combinable or modifiable if their intended function is destroyed. *In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984). Thus, since Haga is designed to reduce a short-circuit current of the Stage 1 inverter, see column 18, lines 39-50 of Haga, even if AAPA were combined with Haga to include an inverter between Haga's sampling level converter circuit and the Stage 1 converter, Haga's Stage 1 converter would not receive the appropriate output (as it would now be inverted), and the improper input into the Stage 1 inverter would result in an improper output from the Stage 1.

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Thus, contrary to the Examiner's allegations, combining Haga and AAPA would not successfully teach the limitations as recited in independent claim 1. Accordingly, Applicant respectfully submits that the Examiner has not met the burden of establishing a prima facie case of obviousness as set forth in MPEP § 2142, and withdrawal of this rejection and allowance of independent claim 1 are respectfully solicited.

Independent Claim 8

Similar to above regarding independent claim 1, although the Examiner acknowledges, and Applicant agrees, that AAPA does not teach all of the elements as recited in independent claim 8, the Examiner relies on Haga to remedy the deficiencies of AAPA. In particular, on page 14 of the Office Action mailed on December 24, 2008, the Examiner contends that Haga teaches "a level shift unit including an inverter to invert the control nozzle selection signal, a first portion to generate a first nozzle selection signal having a first transient time, during which a level of the first nozzle selection signal is changed between first and second levels, in response to the inverted control nozzle selection signal, a second portion to generate a second nozzle selection signal having a second transient time extended by a period from the first transient time of the first nozzle selection signal, and a buffer to output the changed levels of the first and second selection signal."

It is respectfully submitted that Haga does not teach or suggest the limitations lacking in AAPA regarding independent claim 8, for at least the reasons pointed out above with respect to independent claim 1. For example, as discussed above regarding independent claim 1, Haga is limited to a sampling level converter circuit (including MOS transistors MN1, MN2, MN3, and MP1, and capacitors C1 and C2), which is connected to a two-stage CMOS inverter circuit (including MOS transistors MP2, MP3, MN4, MN5, MP4, and MN6). In other words, Haga is designed to reduce a short-circuit current of a Stage 1 inverter (as illustrated in edited FIG. 9 above). See column 18, lines 39-50 of Haga. As such, Haga's Stage 1 inverter merely receives an output directly from the sampling level converter circuit, which is not the same as "inverting the input signal having the converted level, extending a first transient time of the output level of the inverted signal by a predetermined time in accordance with an output signal generating

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when the level of the inputted signal is converted, the transient time being a time period during which the level is converted from a first signal level to a second signal level, and extending a second transient time of the output level of the inverted signal by another predetermined time in accordance with an output signal generating when the level of the inputted signal is converted, the transient time being a time period during which the level is converted from the second signal level to the first signal level,” and “a level shift unit including an inverter to invert the control nozzle selection signal, a first portion to generate a first nozzle selection signal having a first transient time, during which a level of the first nozzle selection signal is changed between first and second levels, in response to the inverted control nozzle selection signal, and a second portion to generate a second nozzle selection signal having a second transient time extended by a period from the first transient time of the first nozzle selection signal” as recited in independent claim 6.

Conversely, as pointed out above in connection with independent claim 1, Applicant’s transient time extending part 243 extends the transient time taken to convert a signal level into a different signal level. That is, the transient time during which the potential level of the signal (first nozzle selection signal) inputted from the level converter 241 to the switching unit 250 is converted from a first signal level to a second signal level and vice versa,” e.g., from a logic “high” signal to a logic “low” signal and vice versa, is extended.

In contrast, Haga does not include first invert the signal output from the sampling level converter circuit before being input to the Stage 1 inverter, but instead merely extend the discharge time of capacitor C2. Therefore, Haga cannot be interpreted as extending an inverted signal output from a first inverter by a transient time of an output potential level of a signal input from Haga’s sampling level converter circuit, and does not remedy the deficiencies of AAPA.

Hence, it is respectfully submitted that Haga and AAPA, alone or in combination, do not teach or suggest, among other things, “inverting the input signal having the converted level, extending a first transient time of the output level of the inverted signal by a predetermined time in accordance with an output signal generating when the level of the inputted signal is converted, the transient time being a time period during which the level is converted from a first signal level to a second signal level, and extending a second transient time of the output level of

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the inverted signal by another predetermined time in accordance with an output signal generating when the level of the inputted signal is converted, the transient time being a time period during which the level is converted from the second signal level to the first signal level,” and “a level shift unit including an inverter to invert the control nozzle selection signal, a first portion to generate a first nozzle selection signal having a first transient time, during which a level of the first nozzle selection signal is changed between first and second levels, in response to the inverted control nozzle selection signal, and a second portion to generate a second nozzle selection signal having a second transient time extended by a period from the first transient time of the first nozzle selection signal,” as recited in independent claim 8 of Applicant’s invention.

Furthermore, as stated above regarding independent claim 1, there would be no motivation to combine Haga and AAPA, for at least the reason that doing so would destroy the purpose and functionality of Haga. That is, as pointed out above, Haga is designed to reduce a short-circuit current of the Stage 1 inverter, see column 18, lines 39-50 of Haga. Therefore, even if AAPA were combined with Haga to include an inverter between Haga’s sampling level converter circuit and the Stage 1 converter, Haga’s Stage 1 converter would not receive the appropriate output (as it would now be inverted), and the improper input into the Stage 1 inverter would result in an improper output from the Stage 1.

Thus, contrary to the Examiner’s allegations, combining Haga and AAPA would not successfully teach the limitations as recited in independent claim 8. Accordingly, Applicant respectfully submits that the Examiner has not met the burden of establishing a prima facie case of obviousness as set forth in MPEP § 2142, and withdrawal of this rejection and allowance of independent claim 8 are respectfully solicited.

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Independent Claim 31

On pages 4-5 of the Office Action mailed on December 24, 2008, the Examiner alleges that AAPA discloses “one or more logic units to increase a time required to change the output nozzle selection signal between the logic high and the logic low.” See page 5, lines 2-4 of the Office Action. However, the Examiner appears to have overlooked the amendments to independent claim 31 from the Amendment After Final Rejection dated July 6, 2007, because independent claim 31 now recites “first and second logic units,” not “one or more logic units.” Therefore, referring to FIG. 2 of AAPA, it is clear that AAPA does not include “first and second logic units to increase a time required to change the nozzle selection signal between the logic high and the logic low,” but is limited to merely to a single inverter 2.

Furthermore, although the Examiner acknowledges on page 12 of the Office Action that AAPA does not disclose “a level shift unit to convert the nozzle selection signal to have a predetermined level to drive the heating element between a logic high and a logic low, and having an inverter to invert the converted nozzle selection signal, and first and second logic units to increase a time required to change the inverted nozzle selection signal between the logic high and the logic low,” the Examiner contends that this feature is taught or suggested by Figure 9; column 18, lines 31-61 of Haga.

However, as pointed out above in connection with independent claims 1 and 8, the cited portions of Haga do not teach or suggest, among other things, “an inverter to invert the converted nozzle selection signal, and first and second logic units to increase a time required to change the inverted nozzle selection signal between the logic high and the logic low,” as recited in independent claim 31. Instead, column 18, lines 39-50 of Haga make clear that Haga is limited to a sampling level converter circuit (including MOS transistors MN1, MN2, MN3, and MP1, and capacitors C1 and C2), which is connected to a two-stage CMOS inverter circuit (including MOS transistors MP2, MP3, MN4, MN5, MP4, and MN6). In this configuration, Haga is limited to reducing a short-circuit current of a Stage 1 inverter (as illustrated in edited FIG. 9 above) to increase the discharge time of capacitor C2, which is distinctly different than “increase[ing] a time required to change the inverted nozzle selection signal between the logic high and the logic low.”

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That is, unlike Haga's two-stage inverter system which merely increases the discharge time of capacitor C2, Applicant's transient time extending part 243 extends the transient time taken to convert a signal level into a different signal level, where the transient time is the time period during which the potential level of the signal (first nozzle selection signal) inputted from the level converter 241 to the switching unit 250 is converted from a first signal level to a second signal level and vice versa," e.g., from a logic "high" signal to a logic "low" signal and vice versa. Accordingly, it is respectfully submitted that Haga's two-stage CMOS inverter system functions in an entirely different way than Applicant's transient time extending part, for at least the reason that the output of the sampling level converter circuit of Haga is not inverted before being input to the Stage 1 inverter, and does not extend the transient time taken to convert a signal level into a different signal level. In contrast, Haga does not include first invert the signal output from the sampling level converter circuit before being input to the Stage 1 inverter, but instead merely extend the discharge time of capacitor C2. Therefore, Haga does not remedy the deficiencies of AAPA with respect to independent claim 31.

Accordingly, for at least the above reasons, it is respectfully submitted that AAPA and Haga, whether taken alone or in combination with one another, fail to teach or suggest all of the features recited in independent claim 31, and withdrawal of this rejection and allowance of claim 31 are earnestly solicited.

Dependent Claims 2-5 and 9-30

With respect to claims 2-5 and 9-30, it is respectfully submitted that for at least the reason that claims 2-5 and 9-30 depend from independent claims 1 and 8 which are patentably distinguishable from AAPA and Haga for at least the reasons provided above, and therefore contain each of the features as recited in independent claims 1 and 8, dependent claims 2-5 and 9-30 are also patentably distinguishable from AAPA and Haga, and withdrawal of this rejection and allowance of these claims are respectfully solicited.

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Examiner's Response to Arguments

On page 23 of the Office Action mailed on December 24, 2008, the Examiner states that "Applicant's arguments filed 09/19/08 have been fully considered but they are not persuasive." In the above Remarks, Applicant has addressed the Examiner's Response to Arguments recited on page 23, as well as the rejection recited on page 2 of the Office Action.

Reconsideration of the pending claims in view of the above Remarks is earnestly solicited.

Conclusion

It is respectfully submitted that a full and complete response has been made to the outstanding Office Action and, as such, there being no other objections or rejections, this application is in condition for allowance, and a notice to this effect is earnestly solicited.

If the Examiner believes, for any reason, that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at the number provided below.

If any further fees are required in connection with the filing of this amendment, please charge the same to our Deposit Account No. 502827.

Respectfully submitted,

STANZIONE & KIM, LLP

Dated: February 24, 2009
919 18th St., NW, Suite 440
Washington, DC 20006
Telephone: (202) 775-1900
Facsimile: (202) 775-1901

By: 
Andrew Lake
Registration No. 53,909